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EDITORIAL.

DISQUIETING reflections affect the minds of many after such a tragedy as the death of our lamented colleague, Howard Jones. Must there not be something radically wrong, they ask, in the social and economic system under which we work, if it not only tolerates, but even appears to be the occasion of a catastrophe so distressing? Is there, we wonder, any other walk in life in which a man can be so great a success, and meet so disastrous an end? By what injustice of affairs does it come about that one who has not squandered his means, his energies, or his time, one who has done distinguished and accepted work in his profession, is yet brought to the dread level of self-destruction?

It is easy to call to mind men who have achieved great professional success and yet have finished in pauperdom. They may be found in the history of every profession. Theirs, however, is a very different story. In these instances there is always to be found an explanation of the disaster which is entirely absent from the tale of Howard Jones. There has been in these other examples extravagance, or thriftlessness, or dissipation, or domestic misery.

None of these things assisted the financial want which destroyed the anæsthetist. Many have before now asserted the unjust and inadequate rewards which are meted out to much of our work. Never before has this iniquity had so striking or so terrible a demonstration. It may be that some such a catastrophe was necessary before public opinion could be aroused, and before men could be brought to realise that many anæsthetists do a vast amount of work in conditions which are unfair and for remuneration which is quite inadequate or actually non-existent. It may be that —and let us hope that it will be—this death was not in vain, and that by it Howard Jones will have helped his fellows even as he was always ready to help them in his life.

THE SECOND EMBLEY MEMORIAL LECTURE DELIVERED AT MELBOURNE UNIVERSITY

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FROM time immemorial there has always been a very natural custom of commemorating the passing of the great. Emperors and kings, great soldiers and sailors, explorers, statesmen, in fact men and women of outstanding merit in any sphere of life, are those thus honoured.

There has always been a veneration for the dead, usually due to the narrow perspective of family affection and intimate knowledge of the life that has passed, but this veneration does not persist in this mundane world for any length of time in the absence of outstanding greatness or achievement attached to those lives keeping their memory fresh. Millions of statues and tombstones are scattered about the world to the memory of lives that have gone and are forgotten: lives which seemed worthy of the expenditure of large sums of money by friends and relations in pathetic attempts to prove their dead worthy of a niche in the temple of Fame. The statue tends to lose its original significance, and its merits in after ages tends to be based upon its artistic value rather than upon the memory of the individual it is supposed to commemorate. Lumps of marble and bronze are static: scholarship and progress are dynamic.

The relief of pain is one of the greatest boons to mankind —such is anæsthesia; and when a pioneer in this subject died it was this natural desire of his fellows to commemorate his work in some lasting manner. Such a pioneer was Edward Henry Embley, whose memory we are here to honour. We have to consider how the seed he sowed,

which had only to become a small plant when he died, has grown in the last eleven years.

The death of such a man causes an immediate shock which seems irreparable at the time, but Nature is kind, and in the passage of years it is possible to look back with an unprejudiced mind, and to form a balanced estimate of the value of the work he has done.

It was the wish of Embley's colleagues and friends to perpetuate his memory; hence the endowment of this lecture and a medal to be given annually to the best student of the year for an essay on the subject which was so near his heart—anæsthesia. In doing this Mr. Mitchell, his son-in-law, and many other subscribers to the fund, acted as Embley, and indeed, any medical man would wish, and they chose, the practical and most certain method of keeping his memory alive and of maintaining a permanent interest in the subject of anæsthesia. The gold medal will always cause keen competition among the students of this great University, and in your appointment of a lecturer you have the opportunity of honouring a senior man who has spent a great part of his life in the study of this branch of our work.

May I express here my appreciation of the honour you have done me in choosing me to deliver this lecture, and my sensibility of the duty imposed upon me of bringing the subject up to date.

As Professor Osborne so truly explained in the opening words of the first Embley Memorial Lecture in 1932, it is customary for the first lecture of a series to be biographical, and I am sure that those of you who heard, or have since read, that lecture, will agree that no one could have done it more ably. It was written from the standpoint of a man who was Embley's close personal friend and for whose scientific and practical work he had a great admiration. With the passage of time it can be given to few of the lecturers of the future to have this advantage, and, indeed, in a short time there will naturally be fewer and fewer men to be found who knew Embley personally. It was my privilege to meet him in London in 1913 at the International Congress of Surgery, just before the Great War. I heard him read his paper at that Congress on the "Dosimetry of

Chloroform", and followed him at the same meeting with a paper of my own on the earliest of the barbiturates, "Hedonal, and its use in Cerebral Surgery". Embley did me the honour of coming to the National Hospital, Queen Square, to see how this drug was given. There he saw the late Sir Percy Sargent remove a lateral recess tumour under hedonal infusion anæsthesia. I remember the incident well, as the late Sir Victor Horsley came into the theatre and, as he was very critical of this form of anæsthesia, he would not have it used for his own cases. I am going to explain later that Horsley was an out-and-out advocate for chloroform and hence was a man after Embley's own heart, and they had a long discussion which was brought about by the modified form of the Vernon Harcourt inhaler in use at the hospital at that time. This inhaler, as some of you may remember, was a dosimetric method for the use of chloroform. That meeting, early one morning in 1913, twenty-two years ago, is clearly defined in my memory. Horsley and Embley talked of chloroform in a way with which I could not then agree, but with which I am much more in symptathy now.

Alas, of those four I alone remain: Horsley, Embley, Sargent have all gone, and writing of them has made me wonder what they would have thought of the form of anæsthesia which, owing to the changed technique in surgery, I now practise in that same theatre. Two of the greatest brain surgeons who have ever lived, who knew what they wanted and got it—a short, light anæsthesia—and an anæsthetist, Embley, who was all in sympathy. What would these men have thought of the modern operation necessitating a perfectly quiet anæsthesia for any length of time up to eight or nine hours? This time-factor is a remarkable innovation: I should like to have been able to say that a great advance has taken place, but I cannot make myself believe it, and already I see signs of these operations being speeded up and hear reports from other countries of the same tendency.

In no department of surgery has a change been more marked since Embley's time than in cerebral surgery. All my working life I have been closely associated with Sir Charles Ballance, Sir Victor Horsley, Sir Percy Sargent,

Donald Armour, the present staff of the National Hospital, and others, so I feel competent to speak with authority on this matter.

The modern cerebral operation takes some surgeons anything from four to nine hours. The fact that I have given anæsthetics for six successful cerebral cases in a day, none of which took more than hour, makes me wonder if the prolonged operations are essential. Further than this, it became my duty during the war to operate on cerebral cases at St. Thomas's Hospital.

The fact that I cannot understand why it is necessary to be so slow, e.g. in removing a bone flap (two hours or more) and again two hours in sewing up a scalp does not concern this argument. It is my business to provide an efficient anæsthesia, and that necessitates new methods. I may here say that the modern prolongation of surgical processes does not apply only to brain surgery. It applies also to general surgery—for example, three hours for an uncomplicated gastrectomy; two hours for enucleation of tonsils; two hours for a prostatectomy. To return to brain surgery, where all the difficulties and dangers of anæsthesia are accentuated. For instance, it is difficult to estimate the condition of a patient who is pulseless from traction on the medulla, or who from high intracranial pressure refuses to breathe. These are both common occurrences in cases I am expected to deal with. Compare all this with the light chloroform anæsthesia demanded by Horsley which, owing to his marvellous ambidexterity and speed, was all that was necessary—three gastrectomies one after the other in an hour and three-quarters, and the patients conscious before leaving the theatre. Then came Sargent with division of the sensory root only. This meant quiet anæsthesia for an hour; and as it happened he disliked the very smell of chloroform; he preferred ether preceded by atropine. The ambidexterity of Horsley and the wonderful dexterity of Sargent are not given to every man: their speed was wonderful; they had no reason to spend eight or nine hours on one case. Surgical technique and asepsis prevent the anæsthetist obtaining access to the head, so other methods of anæsthesia than by the oral route had to be tried: ether *per rectum* and intravenously, which had the objection of

boiling off at body temperature; paralydehyde *per rectum* and intravenously; alcohol intravenously. All were tested; each had objections.

In 1912 came the first of the long series of the barbiturates, hedonal—given intravenously. After meeting Embley at the Congress in London in 1913, and after my paper giving the results of 85 brain tumours removed by this means, the war came and hedonal was unobtainable. My supply was soon exhausted and we had other things to think about. I was doing heavy surgical operating work myself, so I took up ether again and used it by the intratracheal route with a Kelly's machine. Many a time during the War I passed the intratracheal catheter first, then cleaned up and did the operation. This anæsthesia was so successful that it remained my routine for over fifteen years after the War and long after my surgical efforts were over. Sargent would have nothing else used for his cases. Then some surgeons became infected by the slow motion bacillus, and ether under pressure for long periods was useless. An expiratory valve was placed on the feed, a larger catheter used, and finally gas and oxygen as the vehicle for ether instead of air from a blower, which makes a quiet anæsthesia possible with smaller quantities of ether. Such still remains my routine in cerebral surgery and up to date I know of nothing better.

How Embley would have dealt with such a change can only be problematical, but in studying his published work, over which I have spent many hours, there is no doubt in my mind that he would have had much to say with the authority of many years' practical experience and with his great physiological knowledge behind him. Judging from the mass of his scientific papers he was primarily a physiologist by inclination and an anæsthetist by necessity. I do not think that the writer of the very critical, almost peevish letter to the *Inter-Colonial Medical Journal* in 1908, which elicited an editorial note, would not have expressed his views fearlessly. This letter was due to some remarks by a coroner who had not credited Embley with some of his published work and, reading between the lines of the letter, there is no doubt that he had the same distrust of the value of the coroner's opinion as to the cause of a

death under an anæsthetic as many of us have now. It is generally argeed that as scientific records the results of coroners' inquests are useless, and are not only incorrect, but are also harmful.

Turning more particularly to his scientific investigation, Embley, working with Martin, on the basis of their work upon the circulation in the kidneys, pointed out that vaso-constriction is produced by a high percentage of chloroform in the blood. If, however, this percentage is kept down to a level which can be produced by inhalation, vaso-dilatation occurs. This causes the congestion of the venous system and the fall in blood-pressure, facts that are universally admitted. This brought Embley into a controversy over the findings of the Hyderabad Commission. The chief conclusion of the Commision was that death under chloroform was due to a failure of the respiratory system. They denied that a primary cardiac failure occurred, and relied upon tracings which physiologists now say show a gradual weakening of the heart muscle. Embley was one of those who did experimental work to prove this. Such experiments as I saw at Chicago in 1923 leave no doubt in my mind whatever that chloroform has a direct action on the heart muscle in dogs when the air-way is rendered perfect by means of a tracheotomy tube. My practical experience for over thirty years confirms this view.

In 1911 Embley, in a presidential address in the Section of Anatomy, Physiology and Pharmacology, wrote a very able paper on "Syncope, Collapse and Shock". I can hardly believe he ever gave it as an address; it is too long and too involved. However, it is the best paper I have ever read on the subject, full of original work, and should be read by every anæsthetist. It stamps the writer as a thinker, a scientist and a practical anæsthetist, and although these observations were made by Embley in 1911 many of them might well be quoted in the *Manual of Anæsthetics*, published by the Melbourne Baker Institute of Medical Research in the next edition of their monograph. He had the temerity to disagree with Crile's statement that gas and oxygen affords the most effective blockage of afferent nerve impulses reaching the central mechanism, and stated that gas and oxygen and ether were more efficient. This statement

is in agreement with the modern trend of opinion, but it needed a bold man to express this view in 1911.

In that paper, too, when dealing with shock, he points out the futility of using strychnine, especially during anæsthesia, a practice which we must all have seen resorted to, though many of us have been teaching its uselessness. Ergot, pituitary and adrenalin come in for the same criticism. When it was a common practice to use isotonic salt solution he was very downright about its abuse, as the fluid rapidly passes into the tissues causing general or pulmonary oedema. The whole paper was years ahead of its time.

In the *British Medical Journal* as early as 1902 Embley published three articles with numerous tracings on "The causation of death during the administration of chloroform." He starts off by quoting records he had collected of 124 deaths under chloroform, 107 of which occurred before the operation had begun. He then gives a most complete history of all the experimental work which had been done on chloroform up to that date. Following this he gives his own experiments on 289 dogs. Some of his findings are, or should be, classical. He says: "Chloroform has an immediate and progressive effect on the heart muscle. There is no preliminary period of stimulation. There is no abrupt change in the rate of efficiency of the heart." In the second article again: "Chloroform raises the excitability of the vagus mechanism particularly in the early part of the administration. Dangerous inhibition is liable to occur whenever the strength of the chloroform vapour in the air inhaled rises above two per cent". Then again, "The cause of the fall of blood-pressure from administration of chloroform is paralysis of the muscle cells of the heart and of the arterioles. The fall may be further augmented by the slowing of the heart's rate, or suddenly brought to zero by vagus inhibition of the heart". "Atropinization of dogs absolutely abolishes sudden heart arrest from chlorofrom". Failure of respiration in inhalation experiments is mainly due to fall in blood-pressure. With good blood-pressure failure of respiration by inhalation of chloroform is practically impossible.

From all this scientific work comes the clinical aphorism,

"Give atropine and take time in putting the patient under".

These articles produced a laudatory leader in the *British Medical Journal*, April 12th, 1902, showing how three years in the laboratory could produce immediate results in clinical work in saving life, and again emphasizing the importance of using a low percentage vapour for inhalation and the routine use of atropine. They also brought two letters from Colonel Lawrie who naturally supported the dictum of the Hyderabad Commission, "Safety in plenty of air and plenty of chloroform". Another article contained an interesting statement about the routine anæsthesia used in France by Dastre and Morat who always gave a preliminary dose of morphia and atropine and who claimed "many thousands" of cases without fatality which was in contrast to their previous experience. I only vaguely remember the storm which was going on at this time, but, looking back one realises that much of the chloroform mortality was due to pushing the anæsthetic too quickly, causing a holding up of respiration, a high concentration of vapour forming under the mask, then a long deep inspiration and consequent inhalation of an overdose.

The later deaths were due to attempts to get relaxation for prolonged periods to enable the surgeons to perform the much more complicated and prolonged operations which were introduced even in those days.

Embley, discussing ether anæsthesia, pointed out that the respirations are at first hurried and deep, subsequently they become slower and more shallow, and eventually, if ether is pushed to a dangerous extent, cease altogether. Provided the respiratory acceleration is only moderate it assists circulation and so raises the blood-pressure; if excessive it has the opposite effect, and by increased lung ventilation lowers the tension of carbon dioxide, producing an acapnic condition. Failure of respiration is rapidly followed by cessation of the heart beat. These effects are also produced by exhaustion following over-stimulation, and should be kept constantly in mind when an inhalation is likely to be greatly prolonged. The slowing and final cessation of the respiration appear to be ultimately due to poisoning of the respiratory system. Blood-pressure is increased until very deep narcosis is present when a fall of blood-pressure occurs.

The peripheral vascular dilatation, showing itself in flushing of the skin, together with sweating and roseolus rash, is the cause of this fall of blood-pressure. When pushed to an extreme, death occurs and is due to a poisoning of the respiratory centre and to extreme vaso-dilatation causing death by all the blood draining into the tissues. This is well shown in an example which I can demonstrate. Death occurred in this case under deep ether anæsthesia with flooding of oxygen. The operation was the enucleation of tonsil in a child, and death occurred suddenly when the child had appeared well with a bright pink face, but rapid pulse. Post-mortem, the heart and big muscles were empty. Looking at the post-mortem histological evidence and without knowing that death was due to ether any physiologist would say it was typical of a death from histamine shock. We have three such cases in the records of St. Thomas's and no one would have taken more interest in them than Embley. The question I should have put to him would have been: "Are these deaths histomine deaths, due to oxidation of histadine from over oxygenation"? Embley worked out very carefully the effect of ether on the circulation. He found that blood-pressure falls if measures are not taken to prevent peripheral dilatation of the vessels, but when ether is given by a closed inhaler, Clover for instance, this fall is corrected by the limitation of air incident to its use, and the maintenance of the tension of carbon dioxide. What a vista of possible scientific research these slides conjure up. This condition in the lungs, for instance, may be, and I think probably is, the cause of those spreading thromboses which are all grouped under the heading "ether pneumonias". The condition may also be conducive of the so-called collapse of the lung which when infected produces pneumonia. Such cases became more common as surgery became more extensive and deliberate, as the demands of the surgeons became more insistent for relaxation. This relaxation, when attempted with chloroform, was immediately fatal. For years it was considered safe with ether, and then as the surgical demand became greater and greater it was evident that the after-effects were dangerous, and other means had to be found to satisfy surgical requirements.

I have slides here showing death from another cause under ether anæsthesia. So far as I know there is only one other record of such a death from fat embolism under anæsthesia. The patient was a man of rather a flabby type, 35 years of age, who had been in bed more or less for over a year unable to walk. The operation was for suture and lengthening the *tendo achillis*. A student gave him an ordinary straight gas-and-ether anæsthetic and I noticed nothing wrong. The operation was done with the man lying face downwards, and when he was turned over for plaster to be put on, it was noticed he was a pale colour. He became restless and was muttering. His colour became worse and I thought he was going to vomit: so certain was I of this that I reassured the surgeon who wanted to know what was wrong. However, there was no vomiting. Restlessness and colour got rapidly worse and within ten minutes the man was dead. Death was quite unlike anything I had seen before in a theatre, and was exactly like many deaths I have seen in old people after a prolonged illness—all the same symptoms and finally the change of colour. I had no idea why that man died at the time and told the coroner so. It was only a fortnight later when Professor Dudgeon sent for me to see these slides that I knew. The coroner's verdict was " Death under ether anæsthesia". It was owing to his courtesy we ever found out the real cause, as he allowed us to have the necessary parts for histological examination. Such a death is uncommon, but many others must have occurred and that they have not been recognised is due to want of the use of the microscope. It is difficult to believe that ether could have liberated all this liquid fat into the circulation during the short time of the operation. There must have been several pounds of liquid fat present. One of the chief points of interest in this case is the futility of the coroner's inquiry into the cause of death from a scientific point of view.

That death occurs during operation from air embolism has always been suspected. Dr. Keith Simpson records three cases in the *Guy's Hospital Gazette* (February 16th, 1935) proved by careful post-mortem examination. Without question the condition will now be shown to be more common as the pathologists will recognise the post-mortem

condition. This paper certainly explains several deaths I have seen or heard of on the operating table which have been attributed to the anæsthetic, and what also interests me is that he gives details of the other death from fat embolism during anæsthesia. I have been on the look out for such another case since I first published my case in my presidential address at the Section of Anæsthetics of the Royal Society of Medicine.

Search has been made by many anæsthetists and surgeons for some means of producing relaxation by other means for long periods with safety. By long periods I mean for over an hour, for up to that time ether seems reasonably safe in healthy people.

So far this search has only been moderately successful: in the lower abdomen it can be obtained by spinal anæsthesia which produces the only thing comparable to the relaxation produced by deep ether.

There are no records that I can find that Embley did work on spinal anæsthesia which will produce such wonderful abdominal relaxation. From time to time long papers are written describing the use of some particular technique and the use of one particular drug to produce anæsthesia in this way, and, undoubtedly, in some people's hands, spinal anæsthesia gives very good results which other people are unable to obtain. From the early days of stovaine, which I first used in 1904, to the present time, when dilute, light, or heavy solutions of various drugs are used, technique and opinions have varied. Generally, it may be said that spinal anæsthesia has found a place amongst anæsthetics, and that when surgeons have been unable to call upon efficient anæsthesia by other means, it is popular. Dilute solution of percaine are in favour in London, especially for the lower extremities and abdomen. Smaller doses are being given after preliminary narcotics and under gas and oxygen anæsthesia. Removal of tonsils and such like operations were published in one series of reported cases. Spinal headache is one of the worst complications which occur, while chest troubles are by no means unusual. The headache can be a serious event when it occurs; as a preventitive the Trendelenburg position seems to diminish the incidence. In considering the causation of this headache

an interesting case has recently happened in my practice, when the patient, a middle-aged, healthy woman, had severe typical spinal headache—a rectal case to whom I had given avertin, and the surgeon required complete relaxation. I proposed to give here the minimum dose of stovaine in saline, but although I am certain I punctured the theca I could not obtain any cerebro-spinal fluid, so following my fixed routine I gave no injection (incidentally the surgeon had the same experience) and finished the anæsthesia with gas and oxygen. That lady had a severe headache for a fortnight although no cerebro-spinal fluid was withdrawn and no drug injected.

It has been said that other means of producing anæsthesia have been searched for to replace the older inhalation anæsthetics, chloroform and ether, and great advances have been made in the last ten years in this search. I may say I was very glad of the considered opinion of the Council of the Association of Anæsthetists of Great Britain and Ireland, given at the request of the Ministry of Health, that "mixtures of ether and chloroform acted in the same way as dilute chloroform, and were in fact more dangerous, as they gave a sense of false security." This applies, of course, only to mixtures of the liquids, not their vapour, as produced by Walter Tyrrell in 1898, on which principle all modern methods are founded. The advance has chiefly been in the use of various drugs as preliminary medication to enable gas and oxygen anæsthesia to produce a condition suitable for surgery and to abolish the psychical effect of fear before operation. There is no doubt that gas and oxygen is the least harmful of all anæsthetics, but if it is attempted without producing anoxæmia and without supplementation by drugs it is inefficient for any prolonged surgical procedure. Gas is exhaled unchanged and is not absorbed by the tissues. It can be used over and over again by breathing through soda lime to absorb carbon dioxide from the expired gases: this is a great economy of gas and is economic both from the quantity used and by making the necessary apparatus more portable. In this connection Bohr's statement that "lack of CO_2 causes the haemoglobin of the blood to hold on more tightly to its oxygen", must be remembered. An anæsthetised patient

may therefore appear to be properly oxygenated while actually suffering from anoxæmia. Yandell Henderson has pointed out that CO_2 starvation may occur during anæsthesia, and this is more likely to occur when a plenum method is employed. Both these statements, which are fully substantiated, make some form of rebreathing essential, and there is practical evidence of the want of CO_2 when using the soda lime circuit for prolonged periods.

The drugs by which this preliminary narcosis or basal narcosis, as it has been called, is obtained, are very varied and may be divided up into the following groups:

1. Opium and hyoscyamus derivatives.
2. Avertin and paraldehyde.
3. Barbiturates.

None of these are given as anæsthetics by themselves, but simply as accessories to abolish nervous shock and to enable gas and oxygen to be given either by themselves or with the addition of small quantities of ether. With the exception of Class I these are comparatively modern and have really only come into general use since Embley's time. Taking them in the above order, three common forms are in use.

1. *Morphia, Scopolamine* (*Hyoscine Hydrobromide and Omnopon.*

Their use is well known. The first two were used together and produced that condition which was known by the wonderful name "twilight sleep". The public at one time were much enthralled by wonderful descriptions of this condition in the lay press with reference to its use in midwifery. The method has fallen a great deal into disuse owing to its universal use and abuse. It most distinctly has its uses. Two tabloids known as tabloid hyoscine A and B are on the market made by Burroughs Wellcome & Co., and with them it is quite possible to get a patient to the operating table without any recollection of the fact and to procure a very quiet anæsthesia with gas and oxygen, or relaxation with spinal anæsthesia. The disadvantage is that respiration is too shallow to permit sufficient anæsthetic to be inhaled to procure relaxation. Omnopon is used in the

same way, it being about half the potency of morphia, while it is claimed to produce less sickness and disagreeable after effects. These drugs are used hypodermically and take varying times to act. By using about a quarter of the hypodermic dose, morphia can, and is, given intravenously when it acts very quickly and uniformly.

2. *Avertin and Paraldehyde.*

These are the two principle drugs used as basal narcotics by the rectal route. Avertin is the most popular and has an extensive vogue. It is also the most modern and was introduced into the British Isles from Germany. Its use is simple; there have been very few fatalities. Patients as a rule like it and it has few post-operative sequelæ. It is simply tri-brom-ethyl-alcohol and the solution is very easily prepared. Like every other drug its use needs care. The manufacturers (Bayer) issue comprehensive tables for this purpose, it being given according to the body weight—.1 gr. per kilogramme of body-weight is the standard dose. Such a method of estimating the dose can at best be only an arbitrary one. For instance, it would have been fatal to give the acromegallic doctor of 24 stone, I had to deal with a short time ago, 24 stones' worth of avertin; equally it would be futile to give an extremely thyrotoxic woman of four and a half stone, four and a half stone's worth. The anæsthetist must see the patient first, and bearing in mind the nature of the operation and relying on the standard dose, the avertin weight of each individual must be estimated and the dose given accordingly. Thus the avertin weight of the 24-stone patient was estimated at 14 stone and the thyrotoxic lady at seven stone. These estimations both worked satisfactorily. It is astonishing how little anæsthetic is required by these people when the dose is correct, but it is better to give too little avertin than too much as the anæsthesia is so easily controlled after the skin has been incised. The retrograde amnesia is very pronounced and the patients will even talk apparently rationally without any recollection later on. The solution must be made up freshly for each case and, paying strict adherence to the rules drawn up by the manufacturers, should be given about half an hour before operation. When it was first introduced large

doses of morphia or omnopon were advised to be given with it, and I think much of the adverse criticism to avertin was due to their use as they depressed respiration. I never give morphia before avertin and am very careful of doing so after. Avertin lowers the blood-pressure, a fact which can be made use of in cerebral surgery, and it is interesting to watch a rise in blood-pressure after about an hour during such operations. Frankly I do not like it for abdominal work unless the surgeon is competent and willing to use some means of blocking off the nerves. Some such aid is necessary to secure relaxation of the abdominal muscles. I use it for all orthopædic work for which I am constantly giving anæsthetics. That avertin is not so free from after effects as was at one time supposed is now well recognised. Headache, restlessness and vomiting occur, and many people are met who prefer the straight nitrous oxide ether sequence. To one girl I gave three avertin anæsthetics in a week and after the last she had a condition which was indistinguishable from a mild attack of so-called chloroform poisoning. Avertin has won a place amongst anæsthetic drugs and has come to stay.

There are several definite contra-indications to its use. (1) The existence or history of any form of colitis; (2) obstructive interference of the air passages; (3) after premedication with heavy doses of opium.

Paraldehyde is one of the safest drugs we possess and has a very wide margin of safety. Its objections are its insolubility (℥i to ℥iᵨ of saline) and to some people its horrible smell. Again, it is used by body-weight ℥i to the stone. It is extremely useful in children, and morphia can be used to intensify its action. Lately it has again been used successfully in maternity work and, if given before the head has engaged in the pelvis, when it is possible to inject it high up the rectum, it gives peaceful sleep while labour continues unaffected. The babies reek of it, but do not seem unduly sleepy. It has been stated as a contra-indication to its use that the babies do not take their food well in the first two weeks of life, and that in a series of cases their increase in weight was not up to the average. In adults, for general surgery, the bulk of fluid which has to be used makes its use difficult and it is apt to act as an

enema and give uncertain results. It is more soluble in oil, but the absorption is not so good.

Nitrous oxide anæsthesia, with or without oxygen, was, of course, well known to Embley as it had been in use for many years before his time and machines were in existence to give more or less accurate mixtures and percentages. Early in this century these percentages had all been worked out by Hewitt who had a percentage inhaler and was quite cognisant of the value of giving the mixture under pressure which he recognised as being necessary when using nasal gas and oxygen. The method of controlling the flow of gases was crude. In fact, the only way of doing so was to allow them to escape from the storage cylinders into elastic rubber bags. Next from America came the Gwathmey machine with control reducing valves on the cylinders. It is upon the principles of this machine that all modern gas and oxygen machines were founded. I had one of these early Gwathmeys and it is still in use in South Africa. They owed their success to the fact that it was possible to add at will large or small quantities of ether to the mixture of the gases, and made frank recognition that gas and oxygen *per se* as an anæsthetic was futile except for the very shortest and minor surgical procedures. Premedication and the addition of small quantities of ether have made gas and oxygen possible as an anæsthetic and have enabled the surgeon to operate for hours at a time with impunity. The machines now on sale are innumerable, but they all have this in common, that ether can be added at will and definite known percentages can be given. The newer and more complicated can give a high pressure and rebreathing. Personally I prefer simple apparatus and I use the simplest form I know. At the other extreme is the latest form of McKesson which is the Rolls Royce of these machines.

The machine which you have produced in Australia is all that can be desired and is efficient. The cry which was raised of the expense of the gas and difficulty in transport is now no argument as it can be used over and over again as long as the expired carbon dioxide is removed by soda lime. An efficient method of doing this is becoming popular in London chiefly on account of portability, as the cost of gas is not so great as in this country.

There is no question that nitrous oxide is the least toxic of all anæsthetics, but equally without anoxæmia or the use of adjuvants it is the poorest, and relaxation cannot be obtained with its use alone. Scopolamine, morphia and omnopon are all useful in this connection, but something more is wanting. Avertin and paraldehyde have been discussed shortly, but it is in this search for premedication before gas and oxygen that there is much diversity of opinion about the value of the countless forms of barbiturates. Their very multiplicity and complexity is bewildering: every one is hailed as the best, used by enthusiasts, until a fresh one appears. The ideal has not been found, and personally I have no great faith in the group known as the barbiturates producing it. Those of you who can remember the introduction of veronal as a universal hypnotic will remember numerous disasters which were reported from overdosage and idiosyncrasy. Hedonal showed that this same sensitiveness to the drug varied in various people when given intravenously. What is put into a vein is irrecoverable, but I believe the action is more uniform than when given by the mouth as the drug is more certainly taken into the blood stream unaltered. Administered in this way they are safer and the disasters which have been reported after the use of veronal by the mouth do not occur. Many of the observations made in 1912–1913 about hedonal can be made about the newer drugs, but the attempt to produce a surgical anæsthesia entirely by their use has almost been abandoned. The chemical formula of all these barbiturates is very similar, in fact it is difficult to distinguish one from the other. Although I have had experience of the majority I rarely use them now. I prefer scopolamine, morphia, avertin and paraldehyde as being safer and more certain. The barbiturates I have used intravenously are hedonal, isopral, nembutal, pernocton and evipan, in that order. There are many others but they are given chiefly by the mouth, and of these undoubtedly medinal and others are useful. Embley saw me use hedonal about which I was enthusiastic at the time; he was certainly interested, but both he and Horsley looked upon it as a passing phase, and they were right.

We pointed out from St. Thomas's in 1913 that any form

of opium should only be used with great care when this class of drug had been used: this is now generally accepted. Before leaving London I saw several tubes containing another mysterious anæsthetic, another barbiturate said to be much superior to evipan! It had not even been christened and was only designated by a number.

Professor Haas, of Munich, was in London recently; he told me that he had given up the use of the barbiturates in surgery and was relying upon avertin. He told me of a death he had in an ordinary quiescent appendix in a healthy young woman. Pernocton was the drug used. And he told me of dangerous symptoms in other cases when using the same drug. It is rather disturbing to hear such stories about one or another of these drugs from various sources in casual conversation.

The position of the barbiturates remains obscure. It is not all clear what is going to happen. In the hands of some enthusiasts much better results are obtained than can be obtained by other people, but when seen in action they are not quite all that is claimed for them. Just as 13 years ago, when I was in America, I saw the same old difficulties occurring in the hands of experts that I had experienced myself when using less complicated machinery about which there was no need to be so enthusiastic. I saw the very early ethylene anæsthesias, and, good as they were, I heard the same complaints of the surgeons about want of relaxation, which seemed to me to be amply justified.

Another disadvantage in the use of all basal narcotics is an economic one, as the prolonged sleep, restlessness and then ataxia necessitate special nursing for 24 hours.

During the last 11 years there has been a great increase in the use of intratracheal insufflation and this again has been due to a demand for a prolonged quiet anæsthesia. There has been a decided change in the technique of this method since its introduction into England by Kelly, of Liverpool, in about the year 1911. It was originally founded on Elsberg's and Meltzer's work in America, and Kelly, when he returned from a visit to the States, designed a machine of a simple form which depended on a current of air containing a known percentage of ether being delivered under pressure at the bifurcation of the trachea. This was

done by means of a semi-rigid catheter passed between the vocal cords and down which the current of air, laden with ether, was passed under pressure. Expiration took place through the space in front and behind the catheter and was more or less continuous. From the perfect oxygenation, due to an abnormally clear airway, long periods of acapnia resulted. I had one of the very early machines which I used at St. Thomas's and I had a simple form built on to a table at the National which was in use until about 18 months ago. Gradually it became evident that larger sized catheters gave the best results and then, instead of using pressure, respiration was allowed to take place backwards and forwards through these larger catheters through which the anæsthetic vapour is inhaled. Inhalation is rendered possible by the use of an expiratory valve on the delivery tube and gas and oxygen, either with or without small quantities of ether, is inhaled. These catheters are best passed visually between the cords after anæsthetisation, or, as suggested by Magill, a softer variety may be passed blindly down the nose. The knack of doing either is readily attained by practice, but to me it seems better, although the more tedious, to pass the catheter by direct vision down a clean bronchoscope, than down a possibly septic nose. These methods are now used most extensively, and I have no hesitation in some of the cerebral work in using dilute chloroform vapour. Here again the enormous length of time required by some surgeons for the most trivial operations negatives the use of continuous ether, and all the basal narcotics have failed in cerebral surgery, with the exception of avertin. The prolonged cases do well when gas and oxygen is inhaled down a catheter with a minimal quantity of ether.

Laryngologists have recently taken exception to this method of anæsthesia, as they claim to have seen cases of permanent damage to the cords. I can well understand this may be true though so far I have not had such a case brought to my notice. It is essential before the catheter is passed to have the adductors of the cords paralysed, and this only occurs when anæsthesia is deep. Years ago David Ferrier showed that the abductors were paralysed before the adductors, leaving the latter unopposed. This means

that the catheter should not be passed until the adductors have been paralysed also and are no longer the white glistening structures such as we expect the cords to appear. Cocaine has been used in very high percentages to obtain this effect. I cannot see the necessity for the use of cocaine as it adds another poisonous drug, and given sufficient skill and practice in this manœuvre it can be dispensed with. It is the paralysis of the vocal cords which gives such a clear airway when using a deep ether anæsthesia. In fact when the paralysis occurs as it does very suddenly it is then and then only that the perfect relaxation of this form of anæsthesia occurs. The patients are suddenly given the best and freest airway they have ever experienced; their lungs are ventilated as they have never been before; there is over-oxygenation of the blood and a loss of carbon dioxide. In this way the very quiet shallow respiration occurs which is associated with deep ether. Indeed the next stage is an acapnia which is liable to be alarming unless properly understood. For short periods this form of anæsthesia appears to be perfectly safe and most satisfactory for those surgeons who are quick over their work. I know many surgeons who rely upon the relaxation of deep ether to get their speed and to attain results free from after complications. These remarks are chiefly applicable to high abdominal surgery and it is an education to see such rapid experts sewing up a slack peritoneum with a straight needle after doing a difficult gastrectomy in under 40 minutes. Speed in these cases (if not in all) is the greatest factor of safety in surgery.

Of recent years in England there has been a popular outcry fostered by the National Birthday Trust Fund to provide anæsthesia for every woman who is in labour. It is a popular appeal and one with which every medical man or woman must be in sympathy. Unlike many popular movements the people responsible for the fund have endeavoured to determine the best and most practical anæsthetic to entrust to the midwife. A strong committee of the New Obstetrical College in London is now investigating many hundreds of reports from residents in hospitals, midwives and pupils. The agents chiefly considered are nitrous oxide and chloroform, used as analgesics rather than anæs-

thetics and in such a manner that they are self-administered under instruction from a midwife who has herself had special tuition. Nitrous oxide with oxygen has been used for many years for the purpose in the United States of America. It serves its purpose in America for Institutional treatment but is almost impracticable for domicilliary work. Nearly all confinements take place in hospital in the U.S.A. whereas the vast majority of labours in the British Isles take place in the patients' homes, so that if nitrous oxide is to be used a more portable machine is essential. Minnitt, of Liverpool, has attempted to supply the want by means of a more portable machine for the automatic intermittent delivery of nitrous oxide and air to the patient. This machine is now on trial; in the hands of experts in hospitals it is all that is claimed for it, but it is far from really portable and the patient needs education in its use. At home chloroform has been the almost universal analgesic for midwifery and came into general use after being given to Queen Victoria during her later confinements. "Anæsthesia a la Reine", as it was known for years. The employment of chloroform has the great advantage of portability and simplicity, but it is particularly liable to be pushed too far. Chloroform given to the obstetrical degree has to be fully understood, for it can certainly retard labour and be dangerous. The two methods of giving it which are being chiefly investigated are: (1) Chloroform capsules, (2) Mennell's bottle.

The capsules are of the familiar amyl nitrite form, each contains 20 minims of chloroform which should be broken on a mask one at a time. The patient then inhales the chloroform holding the mask near or on her own face. Under supervision the method works well, but the patient cannot be expected to break the capsules herself. The maximum number I have heard of used for one recorded case is 129. This means a big quantity of chloroform and certainly cannot be considered safe in the hands of the inexpert, or without danger in the hands of any but real experts. The bottle which goes by my name is a modification of the junker inhaler which I have attempted to make foolproof. That it is so will readily be seen, and provided the bottle containing the chloroform is not heated, anæsthesia cannot be induced. It can produce analgesia or what

I believe is more important still—amnesia. No method of giving chloroform can be free from the risk of the so-called "delayed chloroform poisoning." In considering this point it must be remembered that the toxæmias of pregnancy very closely simulate this condition and occur when no chloroform has been given. It is interesting to see the differences in the reports from the various centres regarding these methods. It will be equally interesting to see the ultimate opinion as to what should be taught the midwives.

Ethylene, acetylene and other gases of the same group have been used as anæsthetics, but have not gained popularity in England. Cyclopropane is the newest (and at present the most expensive) gas to be tried. Di-vynyl ether or vinethene, as it has been called, is said to fill a gap between chloroform and ether. All these anæsthetics are on trial and may in a few years' time have proved their value and safety sufficiently to be discussed more fully in the next Embley lecture.

What is the outcome of this lecture? There is now a bewildering multiplicity of methods of producing anæsthesia. Embley's plant has become a shrub; one which wants pruning. The undergrowth is overgrown, but the main branches show a healthy growth, and the fruit it bears is already of great assistance to mankind. What this shrub really wants is attention to the roots; more of the spade work put in by men like Embley, the physiologist, to determine the exact action of all these drugs, and to tell us the nature of this condition which we know as anæsthesia.

From a practical standpoint as an anæsthetist of many years experience the message I should give in conclusion is: Keep a clear airway; use as simple machinery as is compatible with efficiency, and remember that even in this mechanical age there has to be human control of the machine. It is the man behind the machine that counts in anæsthesia.

PARALDEHYDE IDIOSYNCRASY

Report of a Case.

By Gilbert Brown, M.B. Ch.B. (Liverpool),

Adelaide, South Australia.

Mr. G. H., aged 20 years, weight 123 lbs., had suffered from hæmatemesis for which a gastroenterostomy had been performed about a year previously. A few months later there had been another profuse hæmetemesis and he had lost one stone in the last six months. An exploratory operation was decided upon and he went into hospital.

When examined on January 2nd, 1934, he was found to be rather anæmic but showed no other abnormality, his blood-pressure being 120–78. He was given nembutal gr. 1½ at 9 p.m. and slept well. The following morning at 8 a.m. (January 3rd, 1934) he was given four drachms of paraldehyde in five ounces of normal saline solution *per rectum*. He went to sleep and, as the sedative effect was fairly marked, only morphine gr. 1/12 and atropine gr. 1/100 was given at 9.15.

He was asleep when brought into the operating theatre, and at 10.22 the anæsthetic was commenced; 8.0 c.c. of ethyl chloride and 20.0 c.c. of ether, by the open method, were required for the induction. An endotracheal catheter was introduced and ether continued by means of Connell's apparatus. The amount of ether required for the maintenance was noticed to be less than usual.

Operation. The operation was begun at 10.36 by Sir Henry Newland. The abdomen was opened and the duodenum and stomach inspected, no sign of ulcer or scar could be detected and so the duodenum and pylorus were opened. The mucous membrane was injected and redundant, one spot was suspicious of a punctiform ulcer. A strip of mucous membrane was excised and the bowel closed. The previous anastamosis was found to be patent. The abdomen was closed and the operation concluded at

11.33. A blood-pressure chart was kept during the operation, the record showing: Before operation, pulse 96, respiration 20, blood-pressure 120–74; after operation, pulse 120, respiration 36, blood-pressure 114–70.

On his return to bed he was given a glucose-saline rectal injection and 10 units of insulin subcutaneously. Carbogen was also given every three hours for three minutes. At 12.30 it was noticed that his respiration was 44 per minute and labouring in character, the pulse-rate was 120. Oxygen was administered by nasal catheter and some improvement took place. At 4 p.m. the breathing was more laboured and mucous was troublesome. Ten ounces of saline and glucose solution was given *per rectum* and 1.0 c.c. of coramine intramuscularly.

When seen at 5.30 he was found to be deeply unconscious, the pupils were dilated and the corneal reflex was absent. The temperature was 102.2°, respiration 48, pulse 124, blood-pressure 118–70. No reflexes of any kind could be obtained. A catheter was passed and 12 oz. of urine was withdrawn; this showed no albumin, sugar, acetone, or diacetic acid. Coramine 1.0 was given intravenously. At 7.30 his respiration was shallower, air entry into the bases of the lungs was deficient, but no adventitious sounds could be heard. Carbogen was administered and this was later followed by continuous oxygen. At 8.30 the continuous administration of saline was begun by rectum. At 10 p.m. the saline was returned. It was then noticed that his pupils reacted to light. Temperature 102.4°, respiration 52, pulse 128. At 11 p.m. a hypodermic injection of strychnine gr. 1/30 was given and this was repeated every four hours. The rectal saline was continued. At 4 a.m. the respiration was 60. Coramine 5.0 c.c. was given intravenously and his condition improved. The blood-pressure was unaltered. At 5 a.m. the temperature was 103°, respiration 72, pulse 136. At 8 a.m. he moaned and moved his head slightly. At 9.30 a.m. bronchoscopy was performed in the bed by Dr. R. H. Glynn and suction was applied to the bronchi. Towards the end of this operation the patient began to move his head and became restless.

Following this coramine 5.0 c.c. was given intravenously and 10 units of insulin subcutaneously. Lumbar puncture

was suggested but was not performed. At 10.50 a.m. he showed signs of returning consciousness which gradually increased until 12.30; he kept lifting his head off the pillow and moved his arms and legs. By 1 p.m. he was very restless and had to be restrained. At 4.30 he was able to swallow sips of water. At 5.10 he opened his eyes several times. At 5.55 he opened his eyes on command, but was very restless. During the night he became quieter, his temperature gradually became lower, and at 4.30 a.m. (temperature 98°, pulse 112, respiration 28) he sat up. At 6.30 he spoke distinctly and asked for a drink. From this time he gradually became more conscious, complained that his throat was sore and that he had pain in his abdomen. He dozed occasionally but took nourishment freely. He made an excellent recovery from this time without any further complications.

Points of Interest. (1) Complete loss of reflexes, even that of eyes to light and corneal reflex. (2) Very little depression of blood-pressure. 3) Rapid respiration. (4) Rise of temperature. (5) Diminished air entry at bases. (6) Probably paraldehyde idiosyncrasy combined with some collapse of the bases of the lungs. The latter was treated by carbogen inhalations, coramine injections (18.0 c.c. in 24 hours) and by bronchoscopic suction.

Summary. A case of paraldehyde idiosyncrasy is reported in which prolonged deep unconsciousness took place after a dose of only four drachms.

ANÆSTHESIA—ITS PRESENT AND FUTURE

By W. Stanley Sykes, M.B., B.Ch.,

Anæsthetist to the General Infirmary at Leeds and to the Hospital for Women, Leeds; late Anæsthetist to the Leeds Dental Hospital.

"SCIENTIFIC research gives courage and a fundamental serenity. It is the securest refuge from the distresses of the human soul . . . the pathway to great adventures and limitless service."

These are the words of Mr. H. G. Wells. His ideals and his opinion are tacitly backed up by many anæsthetists who work under conditions so discouraging that intense keenness and a fervent desire to improve their craftsmanship are almost their sole recompense.

The quotation continues " Its pay and emoluments are the least of its rewards." An exegetical scholar might be pardoned for deducing from this internal evidence the fact that Mr. Wells is an anæsthetist himself!

The most optimistic enthusiast can hardly claim that the science and art of anæsthesia has reached or even approached perfection and finality. The multitude of methods in common use at once negatives any such complacency. The most far-reaching claim possible is that a high standard is reached at some hospitals. But in far too many of these institutions anæsthesia is the Cinderella of medicine,starved, neglected and utterly unprogressive. This backwardness, though regrettable, would be more easily comprehensible if anæsthesia were of little practical importance or if it affected only a negligible proportion of patients. As, however, it vitally affects the comfort and very safety of about 50 per cent of all people admitted to general hospitals and nursing homes it is evident that only the very best is good enough, and that stringent constructive criticism is constantly required in order to lift anæsthesia into the forefront of scientific progress and keep it there.

The ideal aimed at by all competent anæsthetists is threefold. First and paramount is the safety of the patient. Deaths during and after operation will always occur so long as major surgery is undertaken and so long as bad risks are given their last, least chance of life regardless of the virginity of our statistical tables. But the risk must always be cut down to its irreducible minimum. This implies post-operative safety as well as safety at the time. From the patient's point of view it profiteth nothing if he gets off the table alive only to die from some anæsthetic complication several days later.

Secondly, the comfort of the patient. In the interests of all concerned anæsthetics should invariably be made as pleasant as possible. Apart altogether from humane considerations a patient who has had a pleasant anæsthesia will be less apprehensive and less reluctant to undergo any further surgical interference which may be necessary.

Thirdly, the convenience of the surgeon. This, while important, is entirely subordinate to the interests of the patient. Any anæsthetist, after a year or two of experience, can guarantee very deep anæsthesia in the vast majority of cases—deep enough to pacify even those extremely dangerous surgeons who insist on the patient being nearly dead when opening the abdomen. But an anæsthetist who blindly goes all out to satisfy the surgeon with the deepest possible anæsthesia is betraying his trust to the patient. He may get more fees from that particular operator, but they will inevitably be bought at the price of a higher mortality rate.

Is it too much to ask that a reasonable fee be paid for the skill and experience which enables an anæsthetist to approach this threefold ideal with a fair degree of certainty? One hesitates to stress this point but it is no use ignoring it. It is a fact that in many places anæsthetists are badly paid. This inevitably leads to overwork, with the result that there is no time for anything more than a mere mechanical routine. Imagine an operating surgeon so underpaid that he has no time to see his patients before or after operation. He would be in grave danger of degenerating into a mere artisan. He would never see the results of his own mistakes and they would pass unrecognised and uncorrected. He

would not see the effect of alterations in technique and methods and so he would never know whether they led to improved results or the reverse. In short, he would learn nothing.

A great many, perhaps the majority, of anæsthetists in this country are in this very predicament. A vast untapped river of clinical material is constantly running past them to waste, and for reasons which are largely economic no attempt can be made to utilise it or to extract from it the knowledge wherewith to make the art of anæsthesia safer and better than it is to-day.

It will be convenient to describe the defects of the present system as carried out at a large teaching hospital.* For the most part the organisation is as strict as could be found anywhere. No one can hope to aspire to the surgical staff without the F.R.C.S. and many weary years of apprenticeship. The result is that the hospital has acquired a high reputation for surgery. This reputation, firmly rooted in the columns of the local newspapers and aided by occasional boosts from chairmen of appeal committees, stands somewhat less securely on its foundations when it is realised that the department of anæsthesia, that integral and important part of surgery, is regarded as of little importance.

The hospital has a total operation list of 12,000 a year, 8,000 of which are in-patient operations. In spite of this huge total there is no resident anæsthetist. Emergencies and odd cases operated upon when no visiting anæsthetist is available are generally dealt with by unskilled and unsupervised students. This unsatisfactory and dangerous practice is conceivably permissible in a remote country district, but it is impossible to imagine any justification for it in a teaching hospital. Bad in itself, it has many undesirable subsidiary effects which permeate and vitiate the whole surgical outlook of the hospital.

As may be imagined, if anæsthesia is thought to be so easy and so foolproof that an unsupervised dresser can be

* The defects in methods, organisation and equipment mentioned in this paper are all facts, seen by the writer at various hospitals. Similarly, none of the suggested improvements can be dismissed as Utopian or impracticable, because again they have all been seen in actual use by the writer.

entrusted with it, the arrangements for the practical instruction of students in this subject are very unsatisfactory. No time is specifically allotted for this purpose and students are supposed to pick up what they can during their surgical appointments. Obviously tuition would be far more efficient if the visiting anæsthetists had definite pupils to instruct instead of, as at present, a heterogenous crowd of dressers whose interest is largely taken up by their surgical duties.

The moral effect of the whole system is bad. Students trained at a school where anæsthesia is carefully taught and regarded as an important part of surgical team work are not only more competent but, being more competent, are better able to realise their own limitations. On the other hand students who are accustomed to see the work casually handed over to untrained men can never be well taught, for they are bound to think either that there is nothing to learn or alternatively that they already know it all. And who can blame them? The fault is not theirs but that of the surgeons who tolerate such a system. The students have no conception of the importance of the anæsthetic as regards the comfort and safety of the patient, and they also fail to realise that they themselves are less competent than the expert. Sooner or later this unjustified self-confidence leads inevitably to disaster, for nothing is more dangerous than the rashness of complacent ignorance.

The same weird principle—failure to realise that anæsthesia requires any special training or experience—is applied to the election of the visiting anæsthetists. When a vacancy occurs it is filled by any applicant, so long as his name is on the Medical Register. No evidence of proficiency or previous experience is required, an extraordinary method of appointment which applies to no other branch of medicine or surgery.

As a result of this a vicious circle is set up—the surgeon to whom a recently appointed novice is allotted naturally gets bad anæsthetics for some years. Therefore he does not give his anæsthetist any private cases. Then the latter becomes dissatisfied because the hours he spends in hospital do not lead to any paid work, and he either resigns altogether or transfers to another surgeon at the first opportunity. It is a fact that changes in the anæsthetic staff of

this particular hospital are rather frequent. The surgeon then starts the whole weary business over again with another raw novice. Net result; some surgeons never do get satisfactory hospital anæsthetics—some anæsthetists have their enthusiasm crushed out of them altogether.

(To be continued).

THE DIPLOMA IN ANÆSTHETICS

THE following is the list of those to whom the Diploma has been granted under the special regulations:

Ashley Skeffington Daly, L.R.C.P., M.R.C.S., 1905.

Henry Walter Featherstone, L.R.C.P., M.R.C.S., B.Ch. (1917), M.D. (Camb.), 1924.

Christopher Langton Hewer, L.R.C.P., M.R.C.S. (1918), M.B., B.S. (Lond.), 1920.

John Brook Henderson Holroyd, L.R.C.P., M.R.C.S., 1910.

Archibald Daniel Marston, L.R.C.P., M.R.C.S. (1915), L.D.S., R.C.S. (Eng.), 1913.

Zebulon Mennel, L.R.C.P., M.R.C.S. (1900), M.B., B.S. (Lond.), 1901.

Arthur Joseph O'Leary, L.R.C.P. and S. (Edin.), L.R.F.P. and S. (Glas.), 1903.

Harold Sington, L.R.C.P., M.R.C.S., 1905.

George Francis Rawdon Smith, M.B., Ch.B. (Liverpool) 1907, M.D. 1913.

William Stanley Sykes, L.R.C.P., M.R.C.S. (1919), M.B., B.Ch. (Camb.), D.P.H. (Leeds), 1921.

H. E. G. Boyle, *O.B.E.*, L.R.C.P., M.R.C.S. 1901, F.R.C.S. 1935.

R. Brown, M.B., Ch.B. (Aberdeen) 1905, M.D. 1907.

J. M. Clark, M.B., Ch.B. (St. Andrews) 1919.

F. T. Evans, L.R.C.P., M.R.C.S. 1921, M.B., B.S. (Lond.) 1932.

C. F. Hadfield, L.R.C.P., M.R.C.S. 1904, M.D. (Camb.) 1906.

F. Whalley, M.B., Ch.B. (Leeds) 1905.

ABSTRACTS

"Reaction of the reticulo-endothelial system of the lungs to inhalation of ether and chloroform vapours. A. FILIPPI. *Annal. Ital. di Chirurg,* March 1935, p. 271.

The author carried out experiments on rabbits and made microscopic investigation of the lungs after differential staining. In the first group of rabbits, treated by inhalation of ether for one hour and killed either immediately after narcosis or at the end of the subsequent four days, he was unable to demonstrate modifications in the character of the staining or any morphological change in the fibres of the reticular system. In the second group treated in the same way with chloroform certain findings could be regarded as abnormal, but the author says that in the light of present knowledge of the recticular system and of its mode of reacting to disease stimuli we cannot affirm with certainty that the appearances described are to be attributed to damage produced by chloroform products. Simple facts are demonstrated which further studies must confirm or deny.

"Vinethene." G. W. DORFFEL. *Deutsch. Med. Wochensch.,* June 14th, 1935, p. 955.

The author writes of 200 administrations. He regards vinethene as a valuable anæsthetic for short operations and has not employed it for any operation lasting more than 15 minutes. He has used only a simple open method, which accounts for the inefficient anæsthesia obtained in a healthy young boxer. He regards the drug as an excellent one to use on patients with poor heart action. After effects were noticeably few, as one might expect after such short administrations; only three of the 200 patients were sick.

"Susceptibility and resistance of tissues to general anæsthetics. PROF. D. DE B. MACNIDER. *Anæs. and Analg.,* May–June 1935, p. 98, etc.

Interesting observations are recorded on behaviour of liver and kidney cells under various anæsthetic influences.

The parts played by age of subject and by the state of pregnancy are investigated. Animals during pregnancy are much more susceptible to toxic action of ether than unimpregnated females of the same age. Susceptibility increases with the age of the animal. A part of the organotropic susceptibility of the animals to anæsthetics has been found to be associated with the same type of cytological modification (as produced by lung inhalations), an increase within the epithelium of the liver and kidney of lipoid material. The author's main object was to point out the important relationship which anæsthetic substances may have to tissues other than those of the central nervous system.

"Studies in water requirements of surgical patients." A. COLLER and W. G. MADDOCK. *Anæs. and Analg.*, May–June 1935, pp. 140–144.

The authors draw attention to the importance of the continuous insensible loss of water. This may be the largest amount of outgoing water during recovery period after operation and may vary from 1,000 to 2,500 c.c. daily in an adult surgical patient. Dehydration by vomiting, diarrhœa, biliary fistulæ, etc. has received comprehensive study. On the other hand vaporisation of water from lungs and skin has been given too little clinical consideration. Estimation of this loss has enabled the authors to provide accurately for the water requirements of surgical patients and has shown a negative fluid balance to be the cause of grave clinical conditions, the correction of which has prevented death.

"Antalgic therapeutic methods accessible to anæsthetists." PROF. A. M. DOGLIOTTI. *Anæs. and Analg.*, July–August 1935, pp. 150–158.

The author recommends and describes the use of various injections, the most important being subarachnoid spinal injection of absolute alcohol for the treatment of sciatica, neuralgia and some abdominal pains. The treatment is analagous to the injection of alcohol for trigeminal neuralgia. Dogliotti first proposed it in 1930 and has employed this method many times since that date. He records, for example, 178 cases of "rheumatic sciatica", with 148 cures,

25 improved and five unaffected. The method is based on the principle that absolute alcohol is lighter than cerebrospinal fluid. It is injected drop by drop and the roots to be affected are kept uppermost. Only ½ c.c. is used.

"Effect of general anæsthetics on hydrogen ion concentration in blood and urine." B. KANET. *Tohoku Journ. Experim. Med.*, p. 291.

The author has investigated the effect on ion concentration of a number of general anæsthetics including, besides commoner agents, avertin and ethyl chloride. His results were much as might be expected from our previous knowledge. The experiments were carried out on guinea pigs. Generally speaking the hydrogen ion concentration of the blood directly after narcosis and of the urine four hours later was raised. The height of this rise and its duration varied according to what anæsthetic had been employed and according to what length of time that the inhalation had lasted, chloroform causing the most notable and nitrous oxide the least variations.

REVIEWS

"Problems of anæsthesia in general practice." Dr. H. Lukis; p. 158; price 7/6; Hodder & Stoughton, London.

This book in essay form was awarded the Sir Charles Hastings prize of the British Medical Association. It well merited the success, for it is full of sound information and advice based on the author's own experiences. The book will be of most use to those practitioners who are only occasionally anæsthetists. For them it will prove of great service, whether they seek advice as to when they should call in an expert or trust to their own comparatively limited skill, or whether they want instruction as to the actual management of a patient difficult from the anæsthetist's point of view. The estimation of anæsthetic risks, and the problems presented by special operations are so well discussed that the author's words may be read with advantage by the specialists themselves. Nevertheless, it is the practitioner's own point of view that is kept in mind throughout the book. He is advised to be sure, before giving an anæsthetic, that he has the confidence of the patient, the surgeon and himself; Dr. Lukis's advice with regard to the two latter is as sensible as it is wittily expressed. We strongly recommend this little work for the perusal of the readers.

"Theory and practice of anæsthesia." By M. D. Nosworthy, M.A., M.D., B.Ch. (Cantab.), Anæsthetist to Westminster Hospital. London: Hutchinson Scientific Publications. 1935; pp. 223; 12s. 6d.

We know no better small book than this for any man to study when he is beginning to give anæsthetics. That is not to say that it contains no substance for the experienced anæsthetist; indeed, it is so well conceived and clearly written that the expert may gain much from its perusal. Dr. Nosworthy's attitude towards his subject is throughout scientific and up to date, but he is fully alive to the value of the older methods and insists that the student must be thoroughly taught the use of ether and chloroform before

he is allowed to extend his experience to other drugs. The author has a high opinion of the value of carbon dioxide in many conditions, especially for producing separation of the vocal cords. He commends cocaine (10 or 20 per cent) as a spray to the throat to prevent laryngeal reflex, especially before laparotomy, and this measure, which originated we believe with Magill, is certainly not used as often as it deserves to be; its efficacy in aiding abdominal relaxation is remarkable. Dr. Nosworthy does not fail to point out the care that is needed to obviate inhalation of foreign matter when the larynx is thus deprived of its reflex.

In discussing the peripheral causes of respiratory arrest Dr. Nosworthy shows admirably how some of the most modern methods may cause, if ill-applied, the very trouble they are designed to remove. For spinal analgesia Dr. Nosworthy prefers percaine and stovaine to novocain. His advice on the choice of the appropriate anæsthetic in various conditions, premedication, and after-effects is concisely expressed and extremely helpful. Indeed, one of the most attractive features of this excellent little book is that it contains no superfluous words. The print is of a capital size and clearness, and the illustrations plentiful, but the reader is not wearied by detailed descriptions of a large number of different machines all designed on more or less the same principle. Although expressly intended for the student this book is likely to give a profitable hour to any of our readers who peruse it.

OBITUARY

WILLIAM HOWARD JONES, M.B., B.S. (Lond.),

Surgeon Anæsthetist, Charing Cross.

THE death in tragic circumstances of Howard Jones removes a man who had made his name as an anæsthetist known and respected not only in his own country but also widely on the continent of Europe. Born in 1880 Howard Jones was medically educated at Owens College, Manchester, and St. Bartholomew's Hospital, and took the M.B., B.S. (London) in 1913. Subsequently his professional life was entirely given up to the study, practice and teaching of anæsthetics. He held anæsthetic appointments at the London Temperance, Royal Ear, National Orthopædic, and Gordon Hospitals, in addition to his main post of surgeon.

Anæsthetist to Charing Cross Hospital, Jones contributed several valuable articles to the literature of his speciality, and his views were always distinguished by the logical and often witty manner in which he displayed them. The work by which he will be chiefly remembered is no doubt that which he carried out in connection with percain. Our readers will remember his paper "A new regional and spinal analgesia, with special reference to high thoracic nerve root block and a new technique," which appeared in 1930. From that time until his death Jones continued to study, improve and describe his method of using percain for spinal analgesia, and he gained many disciples and much praise. Alas, lucrative practice did not follow in just proportion. In addition to his other labours, Jones was, from its beginning, secretary to the Association of Anæsthetists of Great Britain and Ireland, and did in that capacity a vast amount of

unpaid work, unpaid except by the gratitude which he received in full measure from his colleagues.

They and many other anæsthetists will long hold in memory the name of Howard Jones as that of a fine clinical worker and a most unselfish, loyal and enthusiastic colleague. To his widow and sons we beg to offer our deep sympathy in their great loss.